		Player II		
		B	S	X
Player I	B	$\underline{4},\underline{2}$	0,0	0,1
	S	0,0	$\underline{2},\underline{4}$	$\underline{1}$,3

Pure Strategy NE

$\{((1,0),(1,0,0)), ((0,1),(0,1,0))\}$

- Player I Pure.
  - only B. Then II's payoffs (2,0,1) So No NE.
  - only S. Then II's payoffs (0,4,3) So No NE.

Player II Pure.
- only B. Then I's payoffs (4,2) So No NE.
- only S " (0,2) " .
- only X " (0,1) " .

⟹ So player I must mix between B and S. Player II must mix between at least 2 strategies.

- Player I plays B with probability p.
  - II mixes (B,S) with probabilities $(q, 1-q)$.

    Need: $4q = 2(1-q) \Rightarrow q = 1/3$

    $2p = 4(1-p) \Rightarrow p = 2/3$

    Also $E[\pi_2 / X] \leq E[\pi_2 / B \text{ or } S]$

    $\iff p + 3(1-p) \leq 4(1-p)$

    $2/3 + 3(1/3) \leq 4(1/3)$

    $5/3 \not\leq 4/3$ No!

    So $\nexists$ A MSNE of this type.

• II MIXES (B, X)

NEED $4q = 1-q \Rightarrow q = 1/5$

$$\underbrace{2p}_{E(\pi_2/B)} = \underbrace{p + 3(1-p)}_{E(\pi_2/X)} \geq \underbrace{4(1-p)}_{E(\pi_2/S)}$$

So first EQUALITY implies $p = 3/4$

AND SECOND INEQUALITY $\Leftrightarrow 6/4 \geq 1$ ✓

So $\exists$ A MSNE of THE FORM $((3/4, 1/4), (1/5, 0, 4/5))$

• II MIXES (S, X)

→ NOTE I WOULD ALWAYS DO better playing S only IN response.

→ Already eliminated this CASE so $\nexists$ MSNE OF THIS FORM.

• II mixes (B, S, X) with probs $(q, r, 1-q-r)$.

NEED $E(\pi_2/B) = E(\pi_2/S) = E(\pi_2/X)$

OR $2p = 4(1-p) = p + 3(1-p)$

- FIRST EQUALITY implies $p = 2/3$
- SECOND EQUALITY EVALUATED AT $p = 2/3$:

$$4(1 - 2/3) \stackrel{?}{=} 2/3 + 3(1 - 2/3)$$
$$4/3 \stackrel{?}{=} 2/3 + 3/3$$
$$4/3 \neq 5/3$$

So $\nexists$ A MSNE OF THIS FORM.

SET OF ALL NASH EQUILIBRIA:

$$\left\{ \left((1,0),(1,0,0)\right), \left((0,1),(0,1,0)\right), \left((3/4, 1/4),(1/5, 0, 4/5)\right) \right\}$$